

The Phased Array Terrain Interferometer (PathIn): A New Sensor for UAS Synthetic Vision and Ground Collision Avoidance, Phase I

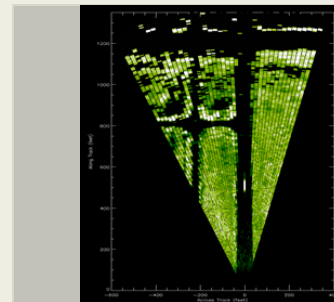
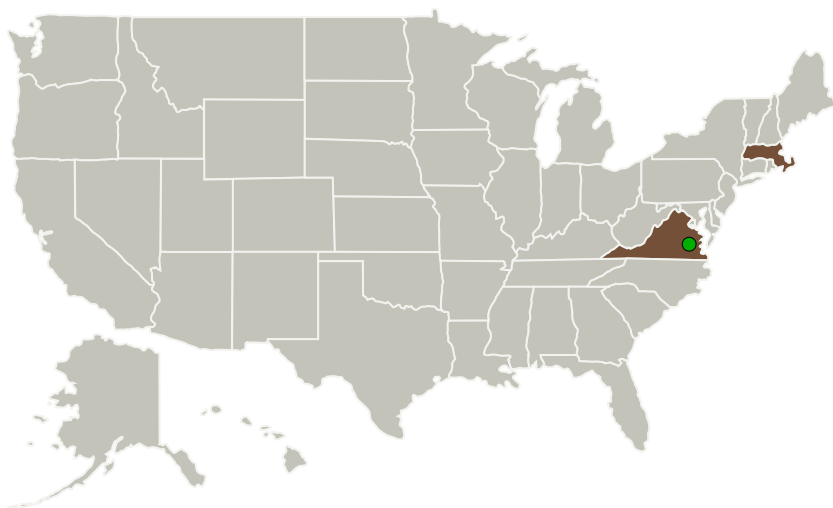
Completed Technology Project (2013 - 2013)



Project Introduction

This proposal introduces an innovative sensor concept for the mitigation of aircraft hazards due to reduced visibility in fog, drizzle and light rain and the detection of hazards/obstacles on runways. Specifically, this effort will build upon a developing synthetic vision system for landing piloted aircraft to: 1) customize the design and feasibility for targeted unpowered autonomous systems (UAS), and 2) incorporate interferometry for terrain mapping and hazard detection. Dubbed "PathIn", the proposed sensor is comprised of a Ka-band digitally beamformed (DBF) radar interferometer that will serve as a complement to existing infrared (IR) and near-IR enhanced visualization systems and provide a real-time data interface for ground-collision avoidance systems. The proposed effort is aligned with the effort to integrate UAS into the National Airspace (NAS). The Phase 1 effort will assess the PathIn performance for sample UAS flight scenarios over variable terrain using a high-fidelity point target simulator to provide synthetic digital surface maps and obstacle detections. This will demonstrate the potential of the PathIn as a technology that can contribute toward safe UAS operation in the NAS and in the terminal area. In Phase II we will realize a prototype of the PathIn sensor, leveraging our extensive radar, interferometry and DBF experience and key technology capabilities. In particular a FPGA-based digital receiver system will be extended for real-time beamforming and interferometry. At the end of the Phase I, a technology readiness level of 3 will be achieved.

Primary U.S. Work Locations and Key Partners



The Phased Array Terrain Interferometer (PathIn): A New Sensor for UAS Synthetic Vision and Ground Collision Avoidance

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Images	3
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

The Phased Array Terrain Interferometer (PathIn): A New Sensor for UAS Synthetic Vision and Ground Collision Avoidance, Phase I

Completed Technology Project (2013 - 2013)



Organizations Performing Work	Role	Type	Location
Remote Sensing Solutions, Inc.	Lead Organization	Industry	Barnstable, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

**May 2013:** Project Start**November 2013:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137362>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Remote Sensing Solutions, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Delwyn K Moller

Co-Investigator:

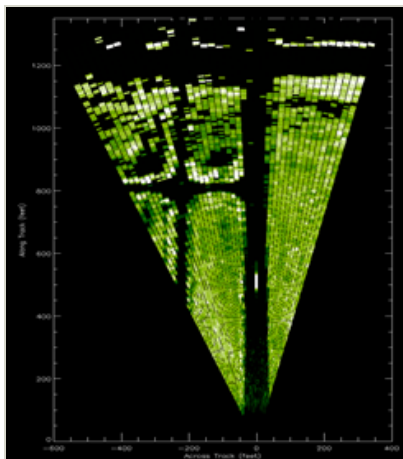
Delwyn K Moller

The Phased Array Terrain Interferometer (PathIn): A New Sensor for UAS Synthetic Vision and Ground Collision Avoidance, Phase I

Completed Technology Project (2013 - 2013)



Images

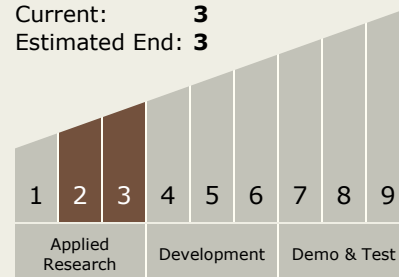


Project Image

The Phased Array Terrain Interferometer (PathIn): A New Sensor for UAS Synthetic Vision and Ground Collision Avoidance (<https://techport.nasa.gov/image/131721>)

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.2 Aircraft Avionics Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System